

PORCUPINE RESERVOIR



Introduction

Porcupine Reservoir is an intermediate reservoir on the Little Bear River above Avon in Cache Valley. It is located in a steep narrow canyon on the East Fork of Little Bear River. The reservoir supplies primarily agricultural water for areas of Cache Valley. It is located in a very scenic area and is picturesque in the spring and early summer.

Porcupine Reservoir was created in 1964 by the

construction of an earth-fill dam. The reservoir shoreline is privately owned, but public access is unrestricted. It is named after Porcupine Creek, which joins the East Fork of the Little Bear River at the reservoir. Although the water from the reservoir is consumed entirely for irrigation in Cache Valley, it provides a valuable recreation area and fishery.

Characteristics and Morphometry

Lake elevation (meters / feet)	1,640 / 5,381
Surface area (hectares / acres)	77 / 190.27
Watershed area (hectares / acres)	15,799 / 39,040
Volume (m ³ / acre-feet)	
capacity	15,419,000 / 12,500
conservation pool	1,850,250 / 1,500
Annual inflow (m ³ / acre-feet)	
Retention time (years)	
Drawdown (m ³ / acre-feet)	14,185,271 / 11,500
Depth (meters / feet)	
maximum	42.4 / 139.1
mean	20.1 / 65.9
Length (km / miles)	2.74 / 1.70
Width (km / miles)	1.07 / .66
Shoreline (km / miles)	6.8 / 4.2

Location

County	Cache
Longitude / Latitude	111 44 08 / 41 31 10
USGS Map	Porcupine Reservoir, 1969
DeLorme's Utah Atlas & Gazetteer™	Page 61, B-4
Cataloging Unit	Little Bear-Logan Rivers (16010203)

Recreation

Porcupine Reservoir is east of Paradise (in southern Cache Valley) in the Bear River Range. From Paradise, go south thorough Avon until you cross the East Fork of Little Bear River. Turn east on a well traveled road up the canyon. The road turns to gravel, but the reservoir is only

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about two miles up the canyon.

Fishing, boating, camping, and picnicking are all popular. Deep drawdowns by late summer restrict recreational use. Boats can be launched on the eastern end of the reservoir, but extra care should be taken as the reservoir draws down to avoid the soft areas near the shoreline that develop.

There are no recreational facilities at the reservoir and only primitive camping is available at the reservoir. Most areas for camping are located below the dam in the canyon.

The watershed is primarily privately owned, with the land adjacent to the reservoir privately owned. Therefore there are no USFS facilities in direct proximity to the reservoir. The nearest public campgrounds are Hyrum State Park in Hyrum. There are USFS campgrounds up Blacksmith Fork east of Hyrum on U-242. Private campgrounds are available in Logan.

Watershed Description

The watershed high point is 2788 m (9,148 ft) above sea level, thereby developing a complex slope of 5% to the reservoir. The major inflows are the East Fork Little Bear River and Porcupine Creek. The outflow is the East Fork Little Bear River. There are no upstream impoundments.

The watershed is made up of high mountains, plateaus and mountain valleys. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities consist of pine, spruce-fir, oak-maple, aspen, and sagebrush-grass. The watershed receives 51 - 102 cm (20 - 40 inches) of precipitation annually. The frost-free season around the reservoir is 120 - 160 days per year.

While the reservoir and watershed are within the Wasatch-Cache National Forest, nearly all the land is privately owned. Land use is primarily grazing and dispersed recreation, although logging and small mining operations have taken place in the past.

Limnological Assessment

The water quality of Porcupine Reservoir is very good. It is considered to be hard with a hardness concentration value of approximately 161 mg/L (CaCO₃). Although there are no overall water column concentrations that exceed State water quality standards, there are reported depressions of dissolved oxygen near the bottom of the reservoir. As indicated in the August 14, 1991 profile the dissolved oxygen declines steadily downward in the water column. Although these values are indicative of later summer conditions it would not be surprising to see anoxic conditions develop later in the winter. It appears that since 1979 nutrient concentrations have decline. Currently total phosphorus concentrations

appear to be very low.

The reservoir is currently classified as a phosphorus limited system. With nutrient concentrations as low as current data indicates and the nitrogen/phosphorus ratios near the threshold point, the reservoir does shift with regards to the limiting nutrient. TSI values indicate the reservoir is oligotrophic in a state of low productivity. Although the profile shown of August 14, 1991 does not show strong stratification, it has stratified during other years. The stratification depicted may get stronger as the season progresses. As stratified conditions develop they will contribute to the process of oxygen loss as previously discussed.

According to DWR no fish kills have been reported in recent years. Brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), cutthroat trout (*Oncorhynchus clarki*), brook trout (*Salvelinus*

Limnological Data			
Data averaged from STORET sites: 490579, 490580			
Surface Data	1979	1989	1991
Trophic Status	M	O	M
Chlorophyll TSI	50.83	45.84	44.77
Secchi Depth TSI	50.01	50.96	41.25
Phosphorous TSI	47.40	17.35	34.25
Average TSI	49.41	38.05	40.09
Chlorophyll <i>a</i> (ug/L)	-	6.7	4.2
Transparency (m)	2	1.95	3.9
Total Phosphorous (ug/L)	20	3	9
pH	8.4	8.5	8.3
Total Susp. Solids (mg/L)	-	-	11
Total Volatile Solids (mg/L)	-	-	4
Total Residual Solids (mg/L)	-	-	13
Temperature (°C / °f)	20/68	19/67	17/63
Conductivity (umhos.cm)	360	300	253
Water Column Data			
Ammonia (mg/L)	0.06	0.01	0.03
Nitrate/Nitrite (mg/L)	0.19	0.05	0.09
Hardness (mg/L)	168	-	167
Alkalinity (mg/L)	164	-	157
Silica (mg/L)	7.7	-	4.5
Total Phosphorous (ug/L)	20	3	8
Miscellaneous Data			
Limiting Nutrient	N	P	P
DO (Mg/l) at 75% depth	5.9	5.9	5.0
Stratification (m)	5-10	NO	NO
Depth at Deepest Site (m)	25	13.7	27.3

fontinalis), splake trout (brook trout cross with lake trout (*Salvelinus namaycush*) and kokanee salmon (*Oncorhynchus nerka*) are the dominant fisheries. According to DWR stocking reports DWR stocks the

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reservoir with 17,000 cutthroat and 500 brook trout fingerling and 8,000 advance fingerling splake. The reservoir has not been chemically treated for the removal of rough fish.

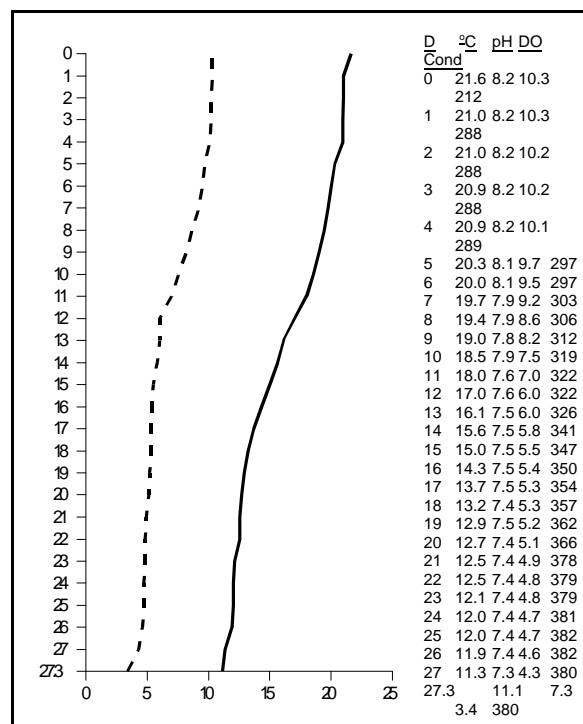
The EPA 1975 NES identified the following phytoplankton by period of sampling:

May 14, 1975 Algal Units per ml
Chroomonas sp. 3,196
Dinobryon sp. 761
Cryptomonas sp. 203

August 6, 1975 Algal Units per ml
Dinobryon sp. 1,147
Cyclotella sp. 688
Cryptomonas sp. 191349
Oocystis sp. 76
Peridinium sp. 38

September 23, 1975 Algal Units per ml
Cyclotella sp. 887
Melosira sp. 242
Dinobryon sp. 202
Asterionella sp. 161
Cryptomonas sp. 121

No macrophytic growth was observed during the survey.



Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume (mm ³ /liter)	% Density By Volume
<i>Sphaerocystis schroeteri</i>	22.202	99.62
<i>Ceratium hirundinella</i>	0.936	0.29
<i>Oocystis</i> sp.	0.142	0.04
<i>Dinobryon divergens</i>	0.104	0.03
Pennate diatoms	0.020	0.01
<i>Asterionella formosa</i>	0.009	0.00
Centric diatoms	0.003	0.00
<i>Chlamydomonas globosa</i>		0.0002

Total 323.417

Shannon-Weaver [H'] 0.03

Species Evenness 0.01

Species Richness 0.33

The phytoplankton community is dominated by the presence of green algae and diatoms associated with fairly good water quality.

Information

Management Agencies

Bear River Association of Governments	752-7242
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Wasatch-Cache National Forest	524-5030
Logan Ranger District	753-2772

Recreation

Bridgerland Travel Region (Logan) / Logan Chamber Of Commerce	752-2161
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Reservoir Administrators

Porcupine Reservoir Company	245-3309
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Pollution Assessment

Nonpoint pollution sources include the following: sedimentation and nutrient loading from grazing; wastes and litter from recreation; and potential contaminants from old mining areas.

There are no point sources of pollution in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).